Calculating Cross Area

(or WxD product)

Channel width (wetted and bankfull) is measured in each of 2 methods – <u>Transect</u> and <u>Thalweg</u>. Refer to Transect method for widths at Transects A0, B0, etc. Refer to the Thalweg Method for widths at A5, B5, etc.

GIVEN:

TransectCode (choices are A0,B0, C0, D0,E0,F0,G0,H0,I0, J0,K0 – data from ***Transect***

ThalwegStationName (choices are A5, B5,C5, D5, E5, F5, G5, H5, I5, J5) – data from ***Thalweg***

ChannelNum (0,1,2,...n) – data from ***Transect*** (Thalweg data are always from Channel 0)

Wetted Width (tenths of m) –data from ***Transect, Thalweg***

BankfulWidth (tenths of m) –data from ***Transect, Thalweg***

ThalwegDepth (cm) –data from ***Thalweg***

AverageBankfulHeight –data from ***Transect***

1. Create a conceptual matrix for ChannelNum = 0

1 Transect Code or ThalwegStation Name	2 WettedWidth	3 BankfulWidth	4 ThalwegDepth	5 AverageBankfulHeight	6 AverageBankfulDepth
A0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
B5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
B0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
B5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
C0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
C5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
D0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
D5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
E0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
E5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
F0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
F5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
G0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
G5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
H0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
H5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
I0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5

I5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
J0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5
J5	from *Thalweg*	from *Thalweg*	from *Thalweg*		
K0	from *Transect*	from *Transect*	from *Thalweg*	from *Transect*	C4 +C5

2. Calculate wetted channel areas from the main channel (Channel 0):

Calculate the WettedWxD cross-sectional areas as in this table.

1 Transect Code or ThalwegStation Name	2 WettedWidth	3 ThalwegDepth	4 WettedWxD
A0	from *Transect*	from *Thalweg*	C2 x C3
B5	from *Thalweg*	from *Thalweg*	C2 x C3
B0	from *Transect*	from *Thalweg*	C2 x C3
B5	from *Thalweg*	from *Thalweg*	C2 x C3
C0	from *Transect*	from *Thalweg*	C2 x C3
C5	from *Thalweg*	from *Thalweg*	C2 x C3
D0	from *Transect*	from *Thalweg*	C2 x C3
D5	from *Thalweg*	from *Thalweg*	C2 x C3
E0	from *Transect*	from *Thalweg*	C2 x C3
E5	from *Thalweg*	from *Thalweg*	C2 x C3
F0	from *Transect*	from *Thalweg*	C2 x C3
F5	from *Thalweg*	from *Thalweg*	C2 x C3
G0	from *Transect*	from *Thalweg*	C2 x C3
G5	from *Thalweg*	from *Thalweg*	C2 x C3
H0	from *Transect*	from *Thalweg*	C2 x C3
H5	from *Thalweg*	from *Thalweg*	C2 x C3
I0	from *Transect*	from *Thalweg*	C2 x C3
I5	from *Thalweg*	from *Thalweg*	C2 x C3
J0	from *Transect*	from *Thalweg*	C2 x C3
J5	from *Thalweg*	from *Thalweg*	C2 x C3
K0	from *Transect*	from *Thalweg*	C2 x C3

NumberOfWettedWxD –count non-null values for WettedWxD
SiteAverageWettedWxDepth - sum WettedWxDepth (cells in column 4), then divide by NumberOfWetttedWxDChan0
SiteStdDevWettedWxD – standard deviation of cells in column 4

3. Calculate bankfull channel areas from the main channel (channel 0):

Calculate the BankfulWxD cross-sectional areas as in this table.

1 Transect Code or ThalwegStation Name	2 BankfulWidth	3 AverageBankfulDepth	4 BankfulWxD
A0	from *Transect*	Calculated above	C2 x C3
B0	from *Transect*	Calculated above	C2 x C3
C0	from *Transect*	Calculated above	C2 x C3
D0	from *Transect*	Calculated above	C2 x C3
E0	from *Transect*	Calculated above	C2 x C3
F0	from *Transect*	Calculated above	C2 x C3
G0	from *Transect*	Calculated above	C2 x C3
H0	from *Transect*	Calculated above	C2 x C3
I0	from *Transect*	Calculated above	C2 x C3
J0	from *Transect*	Calculated above	C2 x C3
K0	from *Transect*	Calculated above	C2 x C3

NumberOfBankfulWxD –count non-null values for BankfulWxD
SiteAverageBankfulWxD - sum BankfulWxDepth (cells in column 4), then divide by NumberOfWetttedWxDChan0
SiteStdDevBankfulWxD – standard deviation of cells in column 4

Metric	SourceFiles	Operation
NumberOfWettedWxD	Thalweg, Transect	Count main channel stations where there is a value for (wetted width x thalweg depth).
SiteAverageWettedWxDepth	Thalweg, Transect	Average of (wetted width x thalweg depth) for all main channel stations across the site.
SiteStdDevWettedWxD	Thalweg, Transect	Standard deviation of (wetted width x thalweg depth) for all main channel stations across the site.
NumberOfBankfulWxD	Thalweg, Transect	Count of main channel stations where there is a value for (bankfull width x bankfull depth).
SiteAverageBankfulWxD	Thalweg, Transect	Average of (bankfull width x bankfull depth) for all main channel stations across the site.
SiteStdDevBankfulWxD	Thalweg, Transect	Standard deviation of (bankfull width x bankfull depth) for all main channel stations across the site.